

**NATO**

**Science for Peace and Security (SPS) Programme**



**Workshop on CBRN Defence – 22-24 October 2013 – Brussels**

*Emerging Security Challenges Division*

**NATO**

**SfP – CBP.EAP.SFP.984208**

**A Multi-Task investigation on the human immune response to anthrax aimed at developing more efficient vaccines**

**Project Co-Directors:**

- |                                  |  |                      |                         |
|----------------------------------|--|----------------------|-------------------------|
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**Approval Date: 6<sup>th</sup> Dec 2011**

**Effective Date: 13 February 2013**

**Duration: Three years**

**End Date: 13 February 2016**

**<http://www.braveproject.org.uk/>**

## General overview

**The majority of the world's population is susceptible to infection with anthrax which is caused by a bacterium called *Bacillus anthracis*.**

**Anthrax is endemic in the Caucasus and our colleagues in Georgia and Turkey see several hundred human cases a year**

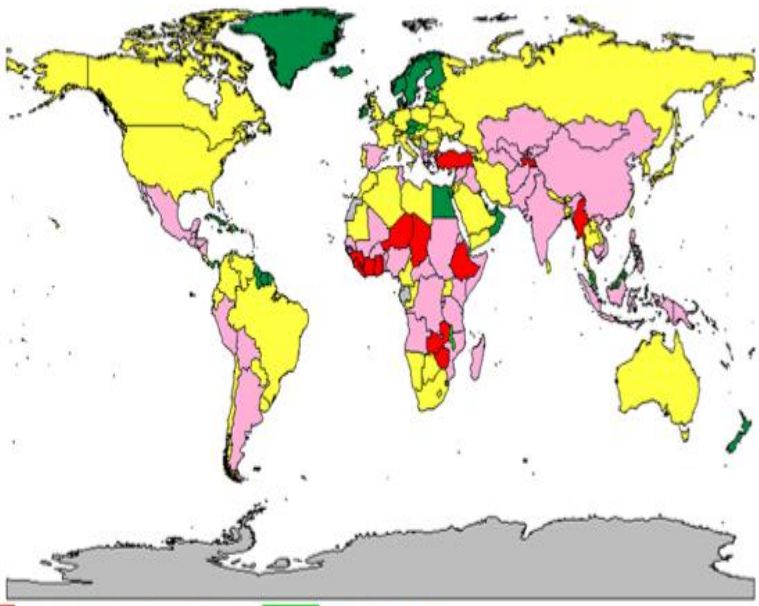
**The US postal attacks in 2001 highlighted the need to develop effective therapies against the terrorist use of this organism.**

**Current vaccines suffer from side effects and required multiple doses to confer long term protection**

# Anthrax Vaccines-Project Description

Welcome to the  
World Anthrax Data Site

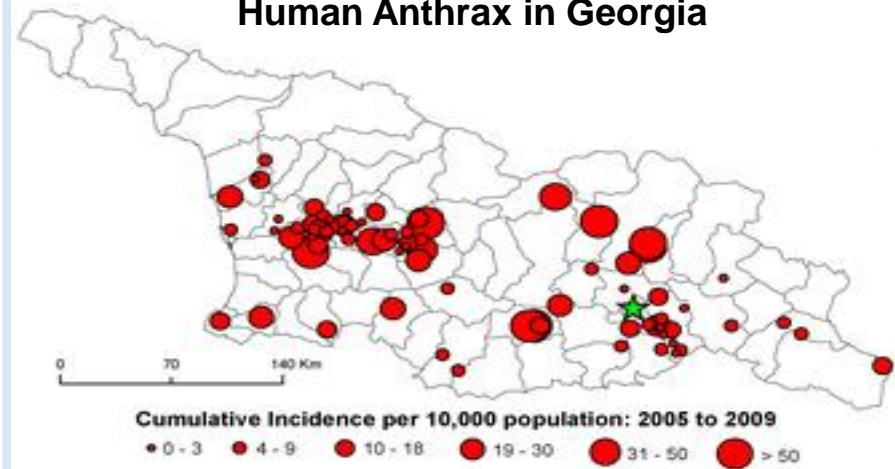
A Service of the  
World Health Organization Collaborating Center  
For Remote Sensing and  
Geographic Information Systems for Public Health



- Hyperendemic / epidemic
- Probably free
- Endemic
- Free
- Sporadic
- Unknown

[http://www.vetmed.lsu.edu/whocc/mp\\_world.htm](http://www.vetmed.lsu.edu/whocc/mp_world.htm)

## Human Anthrax in Georgia



Kracalik IT, et all, (2013) PLSNegITropDis 7(9):e2388

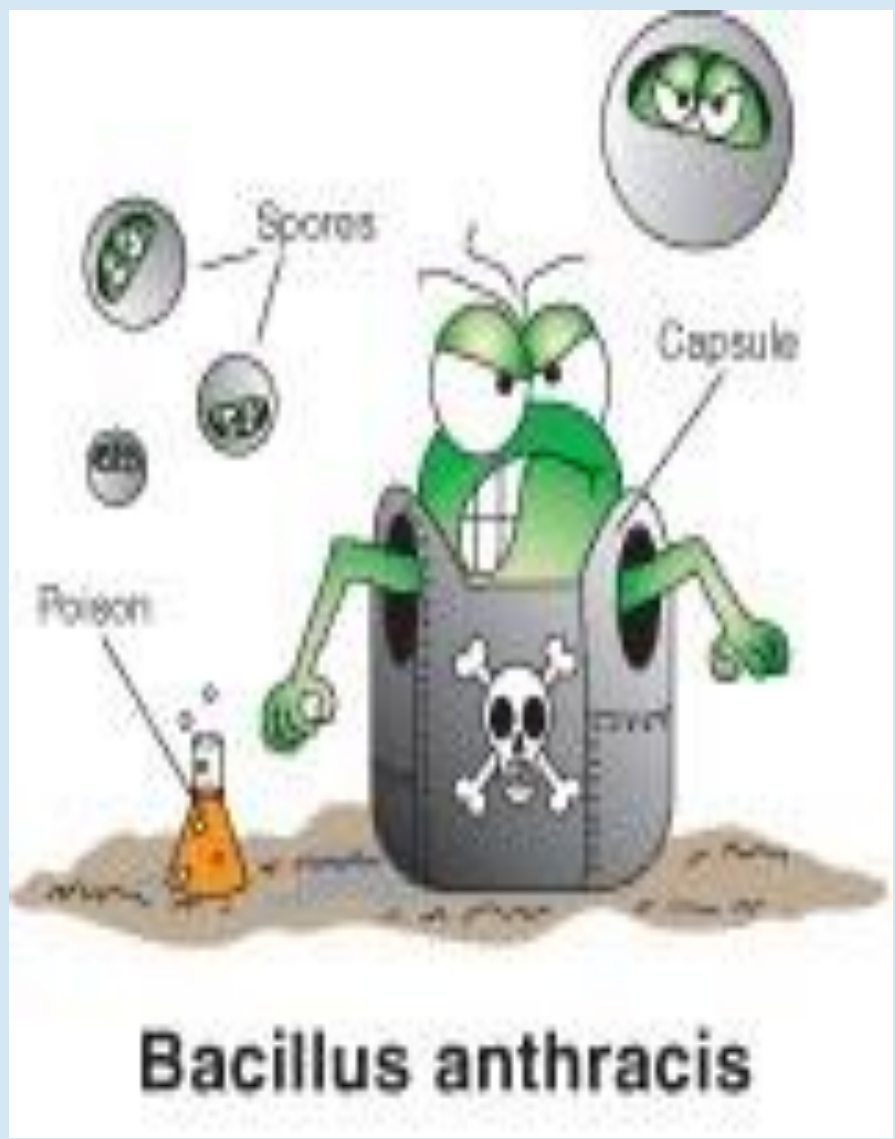
## HUMAN ANTHRAX IN TURKEY



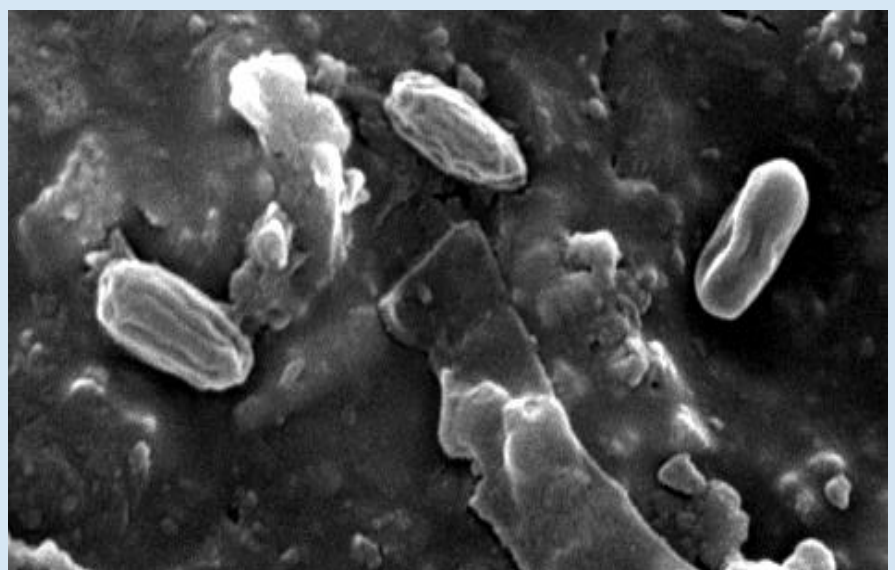
Regional distribution of human anthrax cases recorded between 1995 – 2005 in Turkey

Doganay M, Metan G. Vector-Borne Zoonotic Dis 2009, 9(2): 131-140

# *Anthrax Vaccines-Project Description*



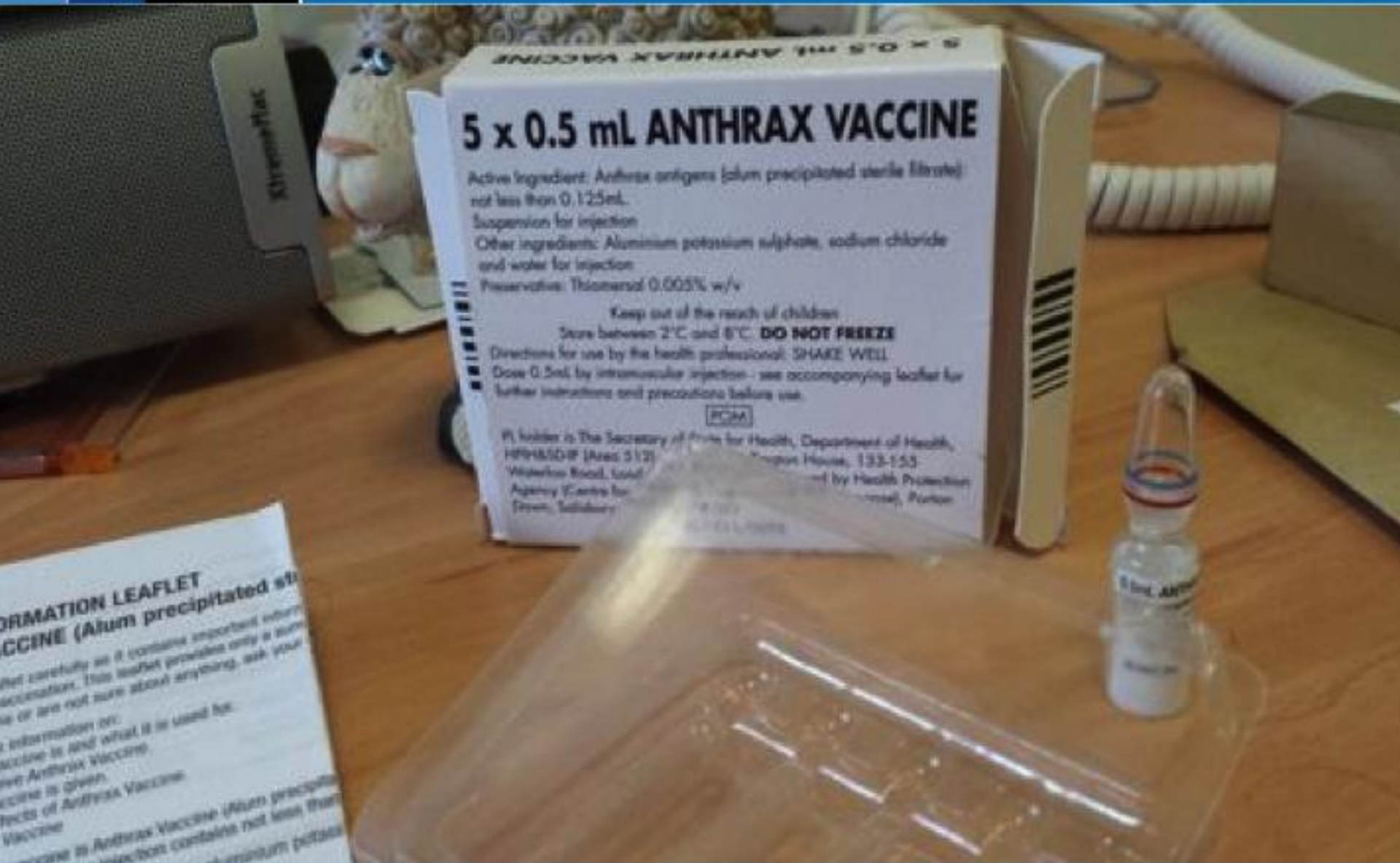
**Bacillus anthracis**



# *Anthrax Vaccines-Project Description*



# *Anthrax Vaccines-Project Description*



## Objectives:

**To characterise the immune response of individuals who have contracted anthrax in Georgia and Turkey and to compare the responses to those seen in vaccinated individuals**

**To employing modern immunological techniques to identify bacterial targets which could form the basis of a next generation human anthrax vaccine.**

**To establish research capability in Georgia and to form collaborative links between researchers in Georgia, Turkey, US and UK**

**To reduce the threat of anthrax**



## **Expected outcomes**

**The information generated by this project will facilitate the development of new subunit anthrax vaccines and medical countermeasures.**

**Scientific outputs (manuscripts, conference presentations etc)**

**Enhance the research capability of Georgia**

**The formation of long lasting links between researchers in Georgia, Turkey, US and UK.**

# *Anthrax Vaccines-Project Outcome*

<b>Criteria for Success</b>	<b>Relative Weight</b>
<i>In terms of success at identifying anthrax vaccine candidates</i>	
1. If at the end of year one we have produced all of the domains of PA and EF	10%
2. If at the end of the second year we have identified at least three protective epitopes within PA and EF	15%
3. If at the end of the project we have identified at least one spore surface antigen that could be included in a future vaccine	10%
4. If at the end of this project we have identified a combination of antigens that could form the basis of a next generation vaccine	40%
<i>In terms of disseminating the results of the study to potential End-users</i>	
5. If two years after the completion of the project two manuscripts based on the research are published in high impact scientific journals	10%
6. If two years after the completion of the project a scientific workshop is held in Georgia at which the results of the protect are presented	10%
7. If two years after the completion of the project new research projects are initiated involving members of the team	5%

## Results



**Kick off meeting**



**Recruitment Young scientists**

## Results (direct scientific and educational successes)

Approval of methods

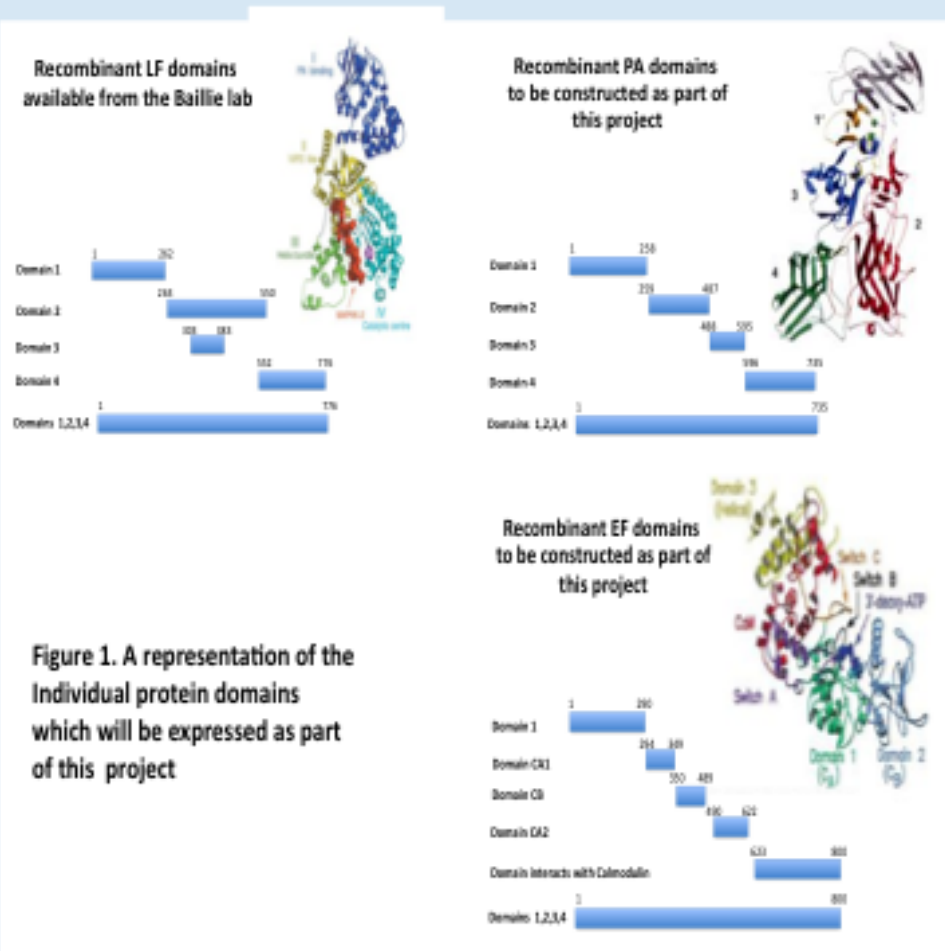
Training of young scientists in cardiff

Collection of serum

Preliminary analysis of serum

Design of protein fragment

expression systems



## Impact:

- **This project will underpin the development of vaccines capable of protecting citizens of NATO and partner countries against the bioterrorist use of anthrax**
- **Increased collaboration between NATO countries and Georgia**
  - **DTRA strain sequencing project**

What research in CBRN Defence requires urgent and substantial attention?

- The protection of civilian populations

What should be the focus of the SPS Programme in CBRN Defence?

- Development of rapid detectors and diagnostics
- Development of fast acting, broadspectrum countermeasures

Ideas for potential SPS activities in the CBRN field

- Co-ordinating national CBRN responses, both Military and civilian
- Decontamination and restoration following a CBRN event